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Recent Scientific Responsibilities

- 1997–present **Principal Investigator**
Various NASA-funded research programs related to chemistry and dynamics in Earth's upper troposphere and lower stratosphere
- 1998–present **Co-Investigator** (PI: Nathaniel Livesey, JPL)
NASA Earth Observing System (EOS) Aura Microwave Limb Sounder (MLS)
- 2011–present **Member**
World Meteorological Organization (WMO) World Climate Research Programme / Stratospheric Processes And Their Role in Climate (WCRP/SPARC) Scientific Steering Group (SSG)
- 2009–present **Member**
NASA Global Modeling and Assimilation Office (GMAO) Advisory Board
- 2008–present **Member**
International Association of Meteorology and Atmospheric Science (IAMAS) International Ozone Commission (IO₃C)
- 2007–present **Member**
American Meteorological Society (AMS) Committee on the Middle Atmosphere
- 2008–2009 **Technical Lead, Science Data Processing Team** (PI: David Crisp, JPL)
Orbiting Carbon Observatory (OCO)
- 2007 **Member**
National Research Council Committee to Review the Climate Change Science Program (CCSP)
Draft Synthesis and Assessment Product (SAP) 2.4: Trends in Emissions of Ozone Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure

Career Outline

- 2009–present **Section Manager / Deputy Section Manager**
Earth Atmospheric Science Section (328), Jet Propulsion Laboratory
Lead scientific and administrative planning for the section, which comprises 7 groups consisting of roughly 85 PhD scientists, postdocs, scientific programmers and support staff.
- 2006–2009 **Group Supervisor**
Microwave Atmospheric Science Group (3284), Jet Propulsion Laboratory
Led scientific and administrative planning for the group (16 PhD scientists, programmers and support staff), working closely with the Aura MLS Principal Investigator (Nathaniel Livesey).
- 1994–present **Principal Scientist / Research Scientist / Scientist**
Microwave Limb Sounder Science Team, Jet Propulsion Laboratory
My technical work is split between scientific research and project-related tasks:
 - ◆ Play a leading role in formulating new atmospheric composition mission concepts to address issues of climate forcing, air quality and global/regional interactions in the upper troposphere, and stratospheric ozone recovery; current mission concepts include a third-generation Scanning Microwave Limb Sounder (SMLS), among other instruments.
 - ◆ Conduct scientific investigations using measurements from the MLS instruments on Aura, launched as part of NASA's Earth Observing System in July 2004, and the Upper Atmosphere Research Satellite (UARS, 1991–2005). Specific interests include: stratospheric polar processes such as chlorine activation and deactivation, polar stratospheric cloud formation, denitrification and dehydration; polar ozone loss; processes controlling trace

gas distributions in the upper troposphere/lowermost stratosphere such as stratosphere-troposphere exchange; transport of pollution in the upper troposphere; and stratospheric effects of solar energetic particle events.

- ◆ Ensure reliability of and assess and document quality of MLS HNO₃, ClO, CH₃Cl, and CH₃CN measurements. Develop analysis tools for evaluating data quality, and participate in refining and testing MLS data processing algorithms. Routinely inspect incoming data.
- ◆ These efforts have resulted in 89 publications, 18 as first author, in major journals such as *Nature*, *Science*, *Proceedings of the National Academy of Sciences*, *Journal of Geophysical Research*, *Geophysical Research Letters*, and *Atmospheric Chemistry and Physics*; have been highlighted in the last seven World Meteorological Organization Scientific Assessment of Ozone Depletion quadrennial reports; and have been featured on the cover of the 2004 American Geophysical Union Fall Meeting program and abstract books.
- ◆ (2008-2009) Led the Orbiting Carbon Observatory (OCO) Science Data Processing Team, providing overall technical management of the OCO Level 2 algorithm development and testing, coordination of algorithm team activities at JPL, Colorado State University, Caltech, University of Leicester (U.K.), and BC Limited (New Zealand), and oversight of interactions between the Algorithm and Calibration and Validation Teams.

1992–1994 **National Research Council Research Associate**

Microwave Atmospheric Science Element, Jet Propulsion Laboratory

Analyzed observations from MLS and other UARS instruments to investigate processes affecting polar ozone in the lower stratosphere.

1987–1992 **Research Assistant**

Division of Geological and Planetary Sciences, California Institute of Technology

Developed retrieval algorithms for the simultaneous determination of the vertical distributions of atmospheric temperature and dust optical depth in the Martian atmosphere from Mariner 9 IRIS thermal emission spectra. Developed a diagnostic stream function model to calculate the meridional circulation of the Martian atmosphere from the retrieved profiles.

1985–1987 **Member of Technical Staff**

Solar System Dynamics Group, Jet Propulsion Laboratory

Member of the Navigation Teams for both the Mars Observer and Magellan missions.

Selected Awards

2009 **NASA Group Achievement Award**

For the Aura Science Team Proposal Group.

2006 **NASA Group Achievement Award**

For the Aura Microwave Limb Sounder Science Team.

2006 **NASA Group Achievement Award**

For the Upper Atmosphere Research Satellite (UARS) Team.

2005 **NASA Group Achievement Award**

For the Aura Project.

2005 **NASA Group Achievement Award**

For the Aura Microwave Limb Sounder Ground Data System Development Team.

2005 **Goddard Space Flight Center Group Achievement Award**

For the Aura Team.

1999 **NASA Exceptional Achievement Medal**

For producing unique scientific information on stratospheric nitric acid and polar processes affecting stratospheric ozone destruction using data from the Microwave Limb Sounder.

1987 **NASA Group Achievement Award**

For the Magellan Navigation Team.

Education

- June 1993 **Ph.D. Planetary Science, California Institute of Technology**
Thesis Advisors: David Crisp (JPL), Andrew Ingersoll
Thesis Title: The Thermal Structure, Dust Loading, and Meridional Transport in the Martian Atmosphere During Late Southern Summer (Thesis defended June 1992)
- June 1989 **M.S. Planetary Science, California Institute of Technology**
- Dec. 1984 **M.S. Aerospace Engineering, University of Texas at Austin**
Thesis Advisors: George Born, Byron Tapley
Thesis Title: Orbit Correction Using Dual-Satellite Crossing Arc Theory
- May 1982 **B.S. Mechanical and Aerospace Engineering, Cornell University**

Submitted Manuscripts

- Damiani, A., B. Funke, D.R. Marsh, M.López-Puertas, **M.L. Santee**, L. Froidevaux, S. Wang, C.H. Jackman, T. von Clarmann, A. Gardini, R.R. Cordero, and M. Storini, Impact of January 2005 solar proton events on chlorine species, *Atmos. Chem. Phys. Discuss.*, 12, 1935–1978, 2011.
- Kuttipurath, J., S. Godin-Beekmann, F. Lefévre, G. Nikulin, **M.L. Santee**, and L. Froidevaux, Record-breaking ozone loss in the Arctic winter 2010/2011: Comparison with 1996/1997, *Atmos. Chem. Phys. Discuss.*, 12, 6877–6908, 2012.
- Kvissel, O.-K., Y.J. Orsolini, F. Stordal, I.S.A. Isaksen, **M.L. Santee**, Formation of stratospheric nitric acid by a hydrated ion cluster reaction: Implications for the effect of energetic particle precipitation on the middle atmosphere, *J. Geophys. Res.*, submitted, 2011.
- Wang, S., K.-F. Li, T.J. Pongetti, S.P. Sander, Y.L. Yung, M.-C. Liang, N.J Livesey, **M.L. Santee**, J.W. Harder, M. Snow, F.P. Mills, Atmospheric OH response to the most recent 11-year solar cycle, *PNAS*, submitted, 2011.

Refereed Publications

2012 (to date)

1. Lambert, A., **M.L. Santee**, D.L. Wu, and J.H. Chae, A-train CALIOP and MLS observations of early winter Antarctic polar stratospheric clouds and nitric acid in 2008, *Atmos. Chem. Phys.*, 12, 2899-2931, 2012.

2011

2. **Santee, M.L.**, G.L. Manney, N.J. Livesey, L. Froidevaux, M.J. Schwartz, and W.G. Read, Trace gas evolution in the lowermost stratosphere from Aura Microwave Limb Sounder measurements, *J. Geophys. Res.*, 116, D18306, doi:10.1029/2011JD015590, 2011.
3. Feng, W. M.P. Chipperfield, S. Davies, G.W. Mann, K.S. Carslaw, S. Dhomse, L. Harvey, C. Randall, and **M.L. Santee**, Modelling the effect of denitrification on polar ozone depletion for Arctic winter 2004/2005, *Atmos. Chem. Phys.*, 11, 6559–6573, 2011.
4. Jones, A., J. Urban, D.P. Murtagh, C. Sanchez, K.A. Walker, N.J. Livesey, L. Froidevaux, **M.L. Santee**, Analysis of HCl and ClO time series in the upper stratosphere using satellite data sets, *Atmos. Chem. Phys.*, 11, 5321-5333, 2011.
5. Khosrawi, F., J. Urban, M.C. Pitts, P. Voelger, P. Achtert, M. Kaphelanov, **M.L. Santee**, G.L. Manney, D. Murtagh, and K.-H. Fricke, Denitrification and polar stratospheric cloud formation during the Arctic winter 2009/2010, *Atmos. Chem. Phys.*, 11, 8471-8487, 2011.
6. Manney, G.L., **M.L. Santee**, M. Rex, N.J. Livesey, M.C. Pitts, P. Veefkind, E.R. Nash, I. Wohltmann, R. Lehmann, L. Froidevaux, L.R. Poole, M.R. Schoeberl, D.P. Haffner, J. Davies, V. Dorokhov, H. Gernhardt, B. Johnson, R. Kivi, E. Kyrö, N. Larsen, P.F. Levelt, A. Makshtas, C.T. McElroy, H. Nakajima, M.C. Parrondo, D.W. Tarasick, P. von der Gathen, K.A. Walker, and N.S. Zinoviev, Unprecedented Arctic ozone loss in 2011, *Nature*, 478, 469–475, doi:10.1038/nature10556, 2011.

7. Manney, G.L., M.I. Hegglin, W.H. Daffer, **M.L. Santee**, E.A. Ray, S. Pawson, M.J. Schwartz, C.D. Boone, L. Froidevaux, N.J. Livesey, W.G. Read, and K.A. Walker, Jet characterization in the upper troposphere/lower stratosphere (UTLS): Applications to climatology and transport studies, *Atmos. Chem. Phys.*, 11, 6115–6137, 2011.
8. Nedoluha, G.E., B.J. Connor, J. Barret, T. Mooney, A. Parrish, I. Boyd, J. Wrotny, R.M. Gomez, J. Koda, **M.L. Santee**, and L. Froidevaux, Ground-based measurements of ClO from Mauna Kea and intercomparisons with Aura and UARS MLS, *J. Geophys. Res.*, 116, D02307, doi:10.1029/2010JD014732, 2011.
9. Pumphrey, H.C., **M.L. Santee**, N.J. Livesey, M.J. Schwartz, and W.G. Read, Microwave Limb Sounder observations of biomass-burning products from the Australian bush fires of February 2009, *Atmos. Chem. Phys.*, 11, 6285–6296, 2011.
10. Su, H., J.H. Jiang, X. Liu, J.E. Penner, W.G. Read, S. Massie, M.R. Schoeberl, P. Colarco, N.J. Livesey, and **M.L. Santee**, Enhanced water vapor transport to the stratosphere by pollutants in Asia, *J. Clim.*, 24, 2728–2736, 2011.
11. Verronen, P.T., **M.L. Santee**, G.L. Manney, and R. Lehmann, Nitric acid enhancements in the mesosphere during the January 2005 and December 2006 solar proton events, *J. Geophys. Res.*, 116, D17301, doi:10.1029/2011JD016075, 2011.

2010

12. **Santee, M.L.**, S.P. Sander, N.J. Livesey, and L. Froidevaux, Constraining the chlorine monoxide (ClO)/chlorine peroxide (ClOOCl) equilibrium constant from Aura Microwave Limb Sounder measurements of nighttime ClO, *PNAS*, 107, 6588–6593, 2010.
13. Damiani, A., M. Storini, **M.L. Santee**, and S. Wang, Variability of the nighttime OH layer and mesospheric ozone at high latitudes during northern winter: Influence of meteorology, *Atmos. Chem. Phys.*, 10, 10,291–10,303, 2010.
14. Jiang, J.H., H. Su, S. Pawson, H-C. Liu, W.G. Read, J.W. Waters, **M.L. Santee**, D.L. Wu, M.J. Schwartz, N.J. Livesey, A. Lambert, R.A. Fuller, and J.N. Lee, Five-year (2004–2009) observations of upper tropospheric water vapor and cloud ice from MLS and comparisons with GEOS-5 analyses, *J. Geophys. Res.*, 115, doi:10.1029/2009JD013256, 2010.

2009

15. Chauhan, S., M. Höpfner, G.P. Stiller, T. von Clarmann, B. Funke, N. Glatthor, U. Grabowski, A. Linden, S. Kellmann, M. Milz, T. Steck, H. Fischer, L. Froidevaux, A. Lambert, **M.L. Santee**, M. Schwartz, W.G. Read, and N.J. Livesey, MIPAS reduced spectral resolution UTLS-1 mode measurements of temperature, O₃, HNO₃, N₂O, H₂O and relative humidity over ice: Retrievals and comparison to MLS, *Atmos. Meas. Tech.*, 2, 337–353, 2009.
16. Kawa, S.R., R.S. Stolarski, P.A. Newman, A.R. Douglass, M. Rex, D.J. Hofmann, **M.L. Santee**, and K. Frieler, Sensitivity of polar stratospheric ozone loss to uncertainties in chemical reaction kinetics, *Atmos. Chem. Phys.*, 9, 8651–8660, 2009.
17. Manney, G.L., R.S. Harwood, I.A. MacKenzie, K. Minschwaner, D.R. Allen, **M.L. Santee**, K.A. Walker, M.I. Hegglin, A. Lambert, H.C. Pumphrey, P.F. Bernath, C.D. Boone, M.J. Schwartz, N.J. Livesey, W.H. Daffer, and R.A. Fuller, Satellite observations and modelling of transport in the upper troposphere through the lower mesosphere during the 2006 major stratospheric sudden warming, *Atmos. Chem. Phys.*, 9, 4775–4795, 2009.
18. Manney, G.L., M.J. Schwartz, K. Krüger, **M.L. Santee**, S. Pawson, J.N. Lee, W.H. Daffer, R.A. Fuller, and N.J. Livesey, Aura Microwave Limb Sounder observations of dynamics and transport during the record-breaking 2009 Arctic stratospheric major warming, *Geophys. Res. Lett.*, 36, L12815, doi:10.1029/2009GL038586, 2009.
19. Popp, P.J., T.P. Marcy, R.S. Gao, L.A. Watts, D.W. Fahey, E.C. Richard, S.J. Oltmans, **M.L. Santee**, N.J. Livesey, L. Froidevaux, B. Sen, G.C. Toon, K.A. Walker, C.D. Boone, P.F. Bernath, Stratospheric correlation between nitric acid and ozone, *J. Geophys. Res.*, 114, D03305, doi:10.1029/2008JD010875, 2009.
20. Urban, J., M. Pommier, D.P. Murtagh, **M.L. Santee**, and Y.J. Orsolini, Nitric acid in the stratosphere based on Odin observations from 2001 to 2007 – Part I: A global climatology, *Atmos. Chem. Phys.*, 9, 7031–7044, 2009.

21. Wespes,C., D. Hurtmans, C. Clerbaux, **M.L. Santee**, R.V. Martin, and P.F. Coheur, Global distributions of nitric acid from IASI/MetOP measurements, *Atmos. Chem. Phys.*, 9, 7949–7962, 2009.

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22. **Santee, M.L.**, I.A. MacKenzie, G.L. Manney, M.P. Chipperfield, P.F. Bernath, K.A. Walker, C.D. Boone, L. Froidevaux, N.J. Livesey, and J.W. Waters, A study of stratospheric chlorine partitioning based on new satellite measurements and modeling, *J. Geophys. Res.*, 113, D12307, doi:10.1029/2007JD009057, 2008.
23. **Santee, M.L.**, A. Lambert, W.G. Read, N.J. Livesey, G.L. Manney, R.E. Cofield, D.T. Cuddy, W.H. Daffer, B.J. Drouin, L. Froidevaux, R.A. Fuller, R.F. Jarnot, B.W. Knosp, V.S. Perun, W.V. Snyder, P.C. Stek, R.P. Thurstans, P.A. Wagner, J.W. Waters, J. Urban, D. Murtagh, P. Ricaud, B. Barret, A. Kleinböhl, J. Kuttippurath, H. Küllmann, G.C. Toon, and R.A. Stachnik, Validation of the Aura Microwave Limb Sounder ClO measurements, *J. Geophys. Res.*, 113, D15S22, doi:10.1029/2007JD008762, 2008.
24. Coffey, M.T., J.W. Hannigan, A. Goldman, D. Kinnison, J.C. Gille, J.J. Barnett, L. Froidevaux, A. Lambert, **M.L. Santee**, N.J. Livesey, B. Fisher, S.S. Kulawik, R. Beer, Airborne Fourier transform spectrometer (FTS) observations in support of EOS Aura validation, *J. Geophys. Res.*, 113, D16S42, doi:10.1029/2007JD008833, 2008.
25. El Amraoui, L., N. Semane, V.-H. Peuch, **M.L. Santee**, Investigation of dynamical processes in the polar stratospheric vortex during the unusually cold winter 2004/2005, *Geophys. Res. Lett.*, 35, L03803, doi:10.1029/2007GL031251, 2008.
26. Kinnison, D.E., J. Gille, J. Barnett, C. Randall, V.L. Harvey, A. Lambert, R. Khosravi, M.J. Alexander, P.F. Bernath, C.D. Boone, C. Cavanaugh, M. Coffey, C. Craig, V.C. Dean, T. Eden, D. Ellis, D.W. Fahey, G. Francis, C. Halvorson, J. Hannigan, C. Hartsough, C. Hepplewhite, C. Krinsky, H. Lee, B. Mankin, T.P. Marcy, S. Massie, B. Nardi, D. Packman, P.J. Popp, **M.L. Santee**, V. Yudin, and K.A. Walker Global observations of HNO₃ from the High Resolution Dynamics Limb Sounder (HIRDLS): First results, *J. Geophys. Res.*, 113, D16S44, doi:10.1029/2007JD008814, 2008.
27. Livesey, N.J., M.J. Filipiak, L. Froidevaux, W.G. Read, A. Lambert, **M.L. Santee**, J.H. Jiang, R.E. Cofield, D.T. Cuddy, W.H. Daffer, B.J. Drouin, R.A. Fuller, R.F. Jarnot, Y.B. Jiang, B.W. Knosp, Q.B. Li, V.S. Perun, M.J. Schwartz, W.V. Snyder, P.C. Stek, R.P. Thurstans, P.A. Wagner, H.C. Pumphrey, M. Avery, E.V. Browell, J.-P. Cammas, L.E. Christensen, D.P. Edwards, L.K. Emmons, R.-S. Gao, H.-J. Jost, M. Loewenstein, J.D. Lopez, P. Nedelec, G.B. Osterman, G.W. Sachse, C.R. Webster, Validation of Aura Microwave Limb Sounder O₃ and CO observations in the upper troposphere and lower stratosphere, *J. Geophys. Res.*, 113, D15S02, doi:10.1029/2007JD008805, 2008.
28. Manney, G.L., W.H. Daffer, K.B. Strawbridge, K.A. Walker, C.D. Boone, P.F. Bernath, T. Kerzenmacher, M.J. Schwartz, K. Strong, R.J. Sica, K. Krüger, H.C. Pumphrey, A. Lambert, **M.L. Santee**, N.J. Livesey, E.E. Remsberg, M.G. Mlynczak, and J.R. Russell III, The high Arctic in extreme winters: Vortex, temperature, and MLS and ACE-FTS trace gas evolution, *Atmos. Chem. Phys.*, 8, 505–522, 2008.
29. Schwartz, M.J., A. Lambert, G.L. Manney, W.G. Read, N.J. Livesey, L. Froidevaux, C.O. Ao, P.F. Bernath, C.D. Boone, R.E. Cofield, W.H. Daffer, B.J. Drouin, E.J. Fetzer, R.A. Fuller, R.F. Jarnot, J.H. Jiang, Y.B. Jiang, B.W. Knosp, K. Krüger, J.-L.F. Li, M.G. Mlynczak, S. Pawson, J.M. Russell III, **M.L. Santee**, W.V. Snyder, P.C. Stek, R.P. Thurstans, A.M. Tompkins, P.A. Wagner, K.A. Walker, J.W. Waters, D.L. Wu, Validation of the Aura Microwave Limb Sounder temperature and geopotential height measurements, *J. Geophys. Res.*, 113, D15S11, doi:10.1029/2007JD008783, 2008.
30. Su, H., J.H. Jiang, Y. Gu, J.D. Neelin, B.H. Kahn, D. Feldman, Y.L. Yung, J.W. Waters, N.J. Livesey, **M.L. Santee**, and W.G. Read, Variations of tropical upper tropospheric clouds with sea surface temperature and implications for radiative effects, *J. Geophys. Res.*, 113, D10211, doi:10.1029/2007JD009624, 2008.
31. Wolff, M.A., T. Kerzenmacher, K. Strong, K.A. Walker, M. Toohey, E. Dupuy, P.F. Bernath, C.D. Boone, S. Brohede, V. Catoire, T. von Clarmann, M. Coffey, W.H. Daffer, M. De Maziere, P. Duchatelet, N. Glatthor, D.W.T. Griffith, J. Hannigan, F. Hase, M. Höpfner, N. Huret, N. Jones, K. Jucks, A. Kagawa, Y. Kasai, I. Kramer, H. Küllmann, J. Kuttippurath, E. Mahieu, G. Manney, C.T. McElroy, C. McLinden, Y. Mebarki, S. Mikuteit, D. Murtagh, C. Piccolo, P. Raspollini, M. Ridolfi, R. Ruhnke, **M.L. Santee**, C. Senten, D. Smale, C. Tetard, J. Urban, and S. Wood, Validation of HNO₃, ClONO₂, and N₂O₅ from the Atmospheric Chemistry Experiment Fourier Transform Spectrometer (ACE-FTS), *Atmos. Chem. Phys.*, 8, 3529–3562, 2008.

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32. **Santee, M.L.**, A. Lambert, W.G. Read, N.J. Livesey, R.E. Cofield, D.T. Cuddy, W.H. Daffer, B.J. Drouin, L. Froidevaux, R.A. Fuller, R.F. Jarnot, B.W. Knosp, G.L. Manney, V.S. Perun, W.V. Snyder, P.C. Stek, R.P. Thurstans, P.A. Wagner, J.W. Waters, G. Muscari, R.L. de Zafra, J.E. Dibb, D.W. Fahey, P.J. Popp, T.P. Marcy, K.W. Jucks, G.C. Toon, R.A. Stachnik, P.F. Bernath, C.D. Boone, K.A. Walker, J. Urban, and D. Murtagh, Validation of the Aura Microwave Limb Sounder HNO₃ measurements, *J. Geophys. Res.*, 112, D24S40, doi:10.1029/2007JD008721, 2007. (Figure 8 featured as AGU's Image of the Week, 11–18 March 2008.)
33. Connor, B.J., T. Mooney, J. Barrett, P. Solomon, A. Parrish, and **M.L. Santee**, Comparison of ClO measurements from the Aura Microwave Limb Sounder to ground-based microwave measurements at Scott Base, Antarctica, in Spring 2005, *J. Geophys. Res.*, 112, D24S42, doi:10.1029/2007JD008792, 2007.
34. Kovalenko, L.J., K.W. Jucks, R.J. Salawitch, G.C. Toon, J.-F. Blavier, D.G. Johnson, A. Kleinböhl, N.J. Livesey, J.J. Margitan, H. Pickett, **M.L. Santee**, B. Sen, R.A. Stachnik, and J.W. Waters, Observed and modeled HOCl profiles in the midlatitude stratosphere: Implication for Ozone Loss, *Geophys. Res. Lett.*, 34, L19801, doi:10.1029/2007GL031100, 2007.
35. Kovalenko, L.J., N.L. Livesey, R.J. Salawitch, C. Camy-Peyret, M.P. Chipperfield, R.E. Cofield, M. Dorf, B.J. Drouin, L. Froidevaux, R.A. Fuller, F. Goutail, R.F. Jarnot, K. Jucks, B.W. Knosp, A. Lambert, I.A. MacKenzie, K. Pfeilsticker, J.-P. Pommereau, W.G. Read, **M.L. Santee**, M.J. Schwartz, W.V. Snyder, R. Stachnik, P.C. Stek, P.A. Wagner, J.W. Waters, Validation of Aura Microwave Limb Sounder BrO observations in the stratosphere, *J. Geophys. Res.*, 112, D24S41, doi:10.1029/2007JD008817, 2007.
36. Lambert, A., W.G. Read, N.J. Livesey, **M.L. Santee**, G.L. Manney, L. Froidevaux, D. Wu, M. Schwartz, H. Pumphrey, C. Jimenez, G. Nedoluha, R. Cofield, D. Cuddy, W. Daffer, B. Drouin, R. Fuller, R. Jarnot, B. Knosp, H. Pickett, V. Perun, W.V. Snyder, P. Stek, R. Thurstans, P. Wagner, J.W. Waters, K. Jucks, G. Toon, R. Stachnik, P. Bernath, C. Boone, K. Walker, J. Urban, D. Murtagh, J. Elkins, E. Atlas, Validation of the Aura Microwave Limb Sounder stratospheric water vapor and nitrous oxide measurements, *J. Geophys. Res.*, 112, D24S36, doi:10.1029/2007JD008724, 2007.
37. Manney, G.L., W.H. Daffer, J.M. Zawodny, P.F. Bernath, K.W. Hoppel, K.A. Walker, B.W. Knosp, C. Boone, E.E. Remsberg, **M.L. Santee**, V.L. Harvey, S. Pawson, D.R. Jackson, L. Deaver, H.C. Pumphrey, A. Lambert, M.J. Schwartz, L. Froidevaux, S. McLeod, L.L. Takacs, M.J. Suarez, C.R. Trepte, N.J. Livesey, R.S. Harwood, and J.W. Waters, Solar occultation satellite data and derived meteorological products: Sampling issues and comparisons with Aura MLS, *J. Geophys. Res.*, 112, D24S50, doi:10.1029/2007JD008709, 2007.
38. Mercer, J.L., C. Kröger, B. Nardi, B.J. Johnson, M.P. Chipperfield, S.W. Wood, S.E. Nichol, **M.L. Santee**, and T. Deshler, Comparison of measured and modeled ozone above McMurdo Station, Antarctica, 1989–2003, during Austral winter/spring, *J. Geophys. Res.*, 112, D19307, doi:10.1029/2006JD007982, 2007.
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- Santee, M.L., "Poles Apart: Why the Ozone Hole Goes South", JPL "Science 101" Seminar, May 2005.
- Santee, M.L., "Combining Measurements and Models to Advance Understanding of Polar Processes", Canadian Modelling of Global Chemistry for Climate Project Summer School, Banff, Canada, May 2004.
- Santee, M.L., "Measurements of ClO in the Polar Lower Stratosphere from the UARS Microwave Limb Sounder", Canadian Meteorological and Oceanographic Society (CMOS) Congress, Ottawa, Canada, June 2003.
- Santee, M.L., "Measurements of ClO in the Polar Lower Stratosphere from the UARS and EOS Aura Microwave Limb Sounder Experiments", University of Toronto, Department of Physics Seminar Series, Toronto, Canada, June 2003.
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